

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : Swarn S. Kalsi, *et al.* Art Unit : 2834
Serial No. : 10/083,927 Examiner : Karl I.E. Tamai
Filed : February 27, 2002 Conf. No. : 5818
Title : THERMALLY-CONDUCTIVE STATOR SUPPORT STRUCTURE

MAIL STOP APPEAL BRIEF – PATENTS

Commissioner for Patents
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REPLY BRIEF

Pursuant to 37 CFR § 41.41, Appellant's response to arguments raised in the Examiner's Answer mailed on June 8, 2006 is as follows:

REMARKS

Claim 1 – No motivation to combine Boer and Albright

The Examiner stated in the Answer that:

Appellant's argument that there is no motivation to combine Boer and Albright is not persuasive for the reasons set forth above. Albright provides literal motivation to provide an inner non-magnetic coil support that substantially entirely supports the coil to counter the vibrations caused by magnetic forces in superconductive machine (col. 1, line 55-60, col. 3, line 56-64), and because the non-magnetic support provides a slot structure to prevent excessive vibrations caused by the large magnetic forces (col. 6, lines 37-61). Appellant's argument that Albright cannot be combined with Boer because Boer requires a magnetic shield zone and a non-magnetic shield zone is not persuasive. Albright teaches both a magnetic shield zone 12 and a non-magnetic shielding zone 14, particularly the non-magnetic zone reduces the vibrations caused by using iron (magnetic teeth) to support coils (col. 1, line 57). (Answer, Pages 11-12)

Appellant respectfully disagrees with the Examiner's contention that motivation exists for combining Boer with Albright to provide "an inner non-magnetic coil support that substantially entirely supports the coil."

Boer's lamination segment 20 (which constitutes part of the lamination stack 1) comprises tooth-shaped segment parts 202 formed from non-magnetic material, and segment parts 201, without teeth, formed from a magnetic material (Boer's FIG. 2, col. 2, lines 5-8, and col. 4, lines 21-32). With reference to this specific construction, Boer explains:

Through this construction, the stator lamination stack and the mounting body are combined to form a single component, which meets all requirements regarding controlling the tangentially attacking forces and ensures a short-circuit proof connection of the air gap winding to the shielding package. The lamination segments fabricated by welding from different segment parts have approximately the same mechanical strength as a homogeneous lamination segment and are divided, due to the magnetic properties, into a magnetic shielding zone and a non-magnetic holding zone. (emphasis added, Boer's col. 2, lines 18-28)

Thus, Boer's specific construction requires that there be a magnetic shielding zone (provided through the magnetic segment portions 201) and a non-magnetic holding zone

(provided through the non-magnetic tooth-shaped portions 202), and that the stator windings be connected to the shielding package to ensure the "short-circuit proof connection."

If Boer's stator winding were to be entirely supported by non-magnetic segments, as the Examiner has suggested, the stator windings would be connected to the non-magnetic sections, and thus Boer's objective of having the windings connected to the magnetic shielding would not be satisfied.

Accordingly, since Boer requires that the stator winding be connected to the magnetic section to form a short-circuit proof connection, to modify Boer's teachings to have the structure supporting the windings constructed from non-magnetic material, would render Boer's apparatus completely unsatisfactory for its intended purpose, and/or change its principle of operation.

Accordingly, there can be no suggestion or motivation for combining Boer with Albright.

Appellant's therefore submits that for this reason alone, the combination of Boer and Albright cannot render independent claim 1, and the claims that depend from it, obvious. For similar reasons as those provided with respect to independent claim 1, independent claims 9 and 30, and the claims that depend from them, cannot be rendered obvious by the cited art. Claims 1, 9 and 30, and the claims that depend from them, are therefore patentable over the cited art.

Claims 1 – Prior Art Fails to Teach claimed Limitation

The Examiner stated in the Answer that:

Boer teaches the inner coils support being a nonmagnetic and thermally conductive metal. Albright is relied upon for the teaching the claimed limitation of the stator coil support structure substantially entirely supporting the coils, which is the limitation that the Appellant added to the claims to overcome the Boer as a 35 DSC 102b reference (see amendment dated 5/16/2005). (Answer, Page 10).

Appellant respectfully disagrees with the Examiner's contentions.

Appellant amended independent claim 1 in the Amendment in Reply dated 5/16/2005, to recite "a stator coil support structure, substantially the entire stator coil support structure constructed of a non-magnetic, thermally-conductive material." Thus, appellant's amendment was not made to add the limitation that "the stator coil support structure substantially entirely

supporting the coils", as contended by the Examiner, but to require that both the ring section and tooth-shaped heat sinking members positioned radially on the ring section, which together form the stator support structure, be constructed from non-magnetic, thermally conductive material.

As explained in Appellant's Appeal Brief, the combination of Boer (U.S. Patent No. 4,356,419) and Albright (U.S. Patent No. 4,330,726) fails to teach this limitation.

Particularly, with respect to Boar, the examiner admits that:

Boer teaches the stator coil support (teeth 2 or 202) being non-magnetic and thermally conductive but not the entire coil support being non-magnetic and thermally conductive material because the radial outer portion of the coils 3, 4, 5 are supported by the magnetic core (1 or 201).
(Answer, Page 9)

Albright, on the other hand, describes:

Each of the stator modules 10 comprises an outer metallic cylindrical portion 12 and an inner nonmetallic cylindrical portion 14. The outer cylinder 12 preferably comprises sectorially shaped laminations of approximately 14 mil-thick silicon steel. The inner cylinder 14 preferably comprises laminations of a material such as glass fibers impregnated with melamine or epoxy resin. The inner cylinder 14 possesses inwardly projecting teeth aligned so as to form slots 18 for the stator bar windings (not shown in FIG. 1 for clarity). The laminations comprising the outer metallic cylinder 12 preferably possess slots 22 which are aligned in the stacking process so as to form dovetail slots which mate with keybars located in the frame surrounding the dynamoelectric machine.

So while Albright arguably discloses an inner cylinder constructed of non-magnetic material, such as glass fibers impregnated with another material, Albright does not describe that such a non-magnetic material is thermally-conductive. To the contrary, as explained in appellant's Appeal Brief, the originally filed application specifically excludes glass-fiber-based materials as materials that can be used to construct appellant's stator support structure due to the low thermal transfer coefficient that characterizes such materials.

Thus, contrary to the examiner's contention, the combination of Boer and Albright fails to teach the limitation of "a stator coil support structure, substantially the entire stator coil support structure constructed of a non-magnetic, thermally-conductive material," required by appellant's independent claim 1.

Appellant therefore respectfully submits that for that reason alone, the combination of Boer and Albright does not render appellant's independent claim 1, and the claims that depend

from it, obvious. For similar reasons as those provided with respect to independent claim 1, independent claims 9 and 30, and the claims that depend from them, cannot be rendered obvious by the cited art. Claims 1, 9 and 30, and the claims that depend from them, are therefore patentable over the cited art.

Claim 1 – Hindsight

The Examiner stated in the Answer:

The non-magnetic coil support 14 includes slots and coil supports which are employed to permit pretension of the glass ties holding the coils in the slots to prevent excessive vibration under normal operating loads and which can be retightened to accommodate relaxation or compression creep of stator coil support (col. 6, line 57-61). The motivation to provide the non-magnetic coil support to substantially support the entire coil comes directly and literally from Albright, and as such is not hindsight reconstruction. (Answer, Page 11)

Firstly, as noted above, appellant's claim 1 recites the feature of "a stator coil support structure, substantially the entire stator coil support structure constructed of a non-magnetic, thermally-conductive material," and not "non-magnetic coil support to substantially support the entire coil."

Second, Albright's stator support structure describes that the structure is constructed from non-magnetic material. Particularly, and as also noted above, the material used is based on glass fibers, which have poor thermal conducting properties. Thus, while not explicitly stated in the Answer, the Examiner is presumably relying on Boer's alleged teaching of heat conductive material, that is used to construct the tooth-shaped segment parts 202, to establish the *prima facie* case of obviousness to reject claim 1. Indeed, as the Examiner stated at page 9 of the Answer: "[a]ustenite [the material used to construct the tooth-shaped segment parts 202] is a non-magnetic steel, which is inherently thermally conductive."

Accordingly, the examiner rejection of claim 1 is based on combining Albright's teaching of the stator support structure's non-magnetic properties with Boer. The Examiner, however, is disregarding the thermal non-conductivity properties of the material used to construct Albright's support structure. The only motivation that exists for this very selective combination of properties of the various materials described in Boer and Albright (i.e., the thermally conductive

property of Boer's tooth-shaped segment parts, and the non-magnetic property of Albright's stator support structure) is appellant's own independent claim 1, which calls for a material that is both non-magnetic, and thermally conductive.

Examiner's combination of Boer and Albright amounts, therefore, to improper hindsight analysis. For this reason too, therefore, appellant's independent claim 1, and the claims that depend from it, are not rendered obvious by the cited art, and are patentable over it. For similar reasons as those provided with respect to independent claim 1, independent claims 9 and 30, and the claims that depend from them, cannot be rendered obvious by the cited art, and are patentable over it.

Claims 7, 15 and 35 – Stand or Fall together

The Examiner stated in the Answer:

Appellant's argument that Laskaris is not a stator coil support structure is not persuasive because the title and specification particularly teach a support for windings in a superconductive machine. Appellant's argument that Boer and Albright do not suggest the use of epoxy is not persuasive because Albright teaches the inner non-magnetic section 14 being an epoxy resin. Therefore, the rejection is proper because Laskaris provides proper motivation for the selection of the epoxy resin and graphite to prevent the coil from sliding, and mere selection of the material is held as an obvious choice to a person of ordinary skill in the art by caselaw.
(Answer, Pages 13-14)

In response, appellant notes as follows.

Firstly, Laskaris describes:

More particularly, the invention relates to such a method and structure which is specially suited for use in the fabrication of superconducting windings of the type that are saddle-shaped and comprised of a number of superconducting conductor elements held together in a large bundle by epoxy resin to form relatively large stator or rotor windings for cryogenic generators and motors in order to overcome the problem of degradation of winding performance caused by frictional heat generated by relative sliding motion between such windings and their support structures. (Laskaris, col. 1, lines 14-24)

Thus, contrary to the examiner's contention, Laskaris support structure is used to form saddle-shaped windings. Presumably, once individual windings have been formed to assume a

saddle-shape, such windings may be used to assemble stators and/or rotors. But the support structure described in Laskaris is not a stator support structure, but rather a support structure to support individual windings.

Second, to establish a *prima facie* case of obviousness to combine the Boer, Albright and Laskaris references so as to arrive at appellant's claimed invention, there must be some motivation or suggestion to combine these references. Particularly, as explained in MPEP2143.01:

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000).

The Examiner argued that "the rejection is proper because Laskaris provides proper motivation for the selection of the epoxy resin and graphite to prevent the coil from sliding." However, that reasoning merely explains the motivation Laskaris had for selecting that material to construct its support structure. This reasoning provides no motivation whatsoever as to why a person of ordinary skill in the art would turn to Laskaris and combine it with the two other prior art references, namely, Boer and Albright, relied upon by the examiner to reject appellant's claim 7.

To the contrary, as appellant explained in the Appeal Brief, a person of ordinary skill in the art would not turn to Laskaris for its teaching regarding the graphite-epoxy materials because Laskaris is not directed to a stator support structure, and because Laskaris deals with the problem of the sliding motion of windings on their respective support structures, and not with the problems of excessive vibrations and magnetic flux, which are the problems that Boer and Albright address.

Appellant therefore submits that a *prima facie* case of obviousness in relation to claim 7 has not been met. Accordingly, claim 7, as well as claims 15 and 35, cannot be rendered obvious by the cited prior art, and are therefore patentable over it.

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Conclusion

For the foregoing reasons, and the reasons stated in the Appeal Brief, appellant submits that the final rejection should be reversed.

Any circumstance in which the appellant has addressed certain comments of the Examiner, but not others, does not mean that the appellant concedes the other comments of the Examiner. Rather, in such circumstances that appellant has not specifically addressed the Examiner's comments, appellant relies entirely on appellant's comments as presented in the Appeal Brief.

Accompanying this Reply Brief is a Request for Oral Hearing. The fees in the amount of \$1000 are being paid concurrently on the Electronic Filing System (EFS) by way of Deposit Account authorization.

Please apply any other required fees to deposit account 06-1050, referencing the attorney docket number shown above.

Respectfully submitted,

Date:

July 25, 2005

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